



Surveillance Impact Report

Unmanned aerial vehicles ("UAV" or "Drone" technology)
Public Works

As required by San Francisco Administrative Code, Section 19B, departments must submit a Surveillance Impact Report for each surveillance technology to the Committee on Information Technology ("COIT") and the Board of Supervisors.

The Surveillance Impact Report details the benefits, costs, and potential impacts associated with the Department's use of Unmanned aerial vehicles ("UAV" or "Drone" technology).

DESCRIPTION OF THE TECHNOLOGY

The Department's mission is to: enhance the quality of life in San Francisco as responsible stewards of the public's physical assets by providing outstanding service in partnership with the community. We design, build, manage, maintain, green, protect and improve the City's public spaces (infrastructure, public right of way and facilities) with skill, pride, innovation, and responsiveness.

In line with its mission, the Department uses Unmanned aerial vehicles ("UAV" or "Drone" technology) to Drone technology will support our mission through the following:

1. In times of disaster preparedness or post-disaster mitigation, drones will provide critical emergency response functions such as logistical support for emergency routing, life safety, and cleanup efforts, not only assisting in protecting physical assets and public spaces but human life as well;
2. Drones will support the maintenance efforts of City-owned street trees pursuant to our mission of greening and improving City public spaces;
3. Drones will support the objective of maintaining city owned properties and landscapes by safely providing detailed photographic data and documentation to assist in the planning of corrective or new construction work by roofers, architects, engineers, electricians, PMs, CMs and other personnel.

Public Works shall use Unmanned aerial vehicles ("UAV" or "Drone" technology) only for the following authorized purposes:

Authorized Use(s):

Disaster preparedness and response

Environmental monitoring and documentation

Inspect/Survey properties & assets

Project inspection and documentation

Surveying/Mapping data collection

Prohibited use cases involve any uses not stated in the Authorized Use Case section

Further, processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the

purpose of uniquely identifying an individual person, data concerning health or data concerning an individual person's sex life or sexual orientation shall be prohibited.

Department technology may be deployed in the following locations, based on use case:

- **For city and trees data collection:** Neighborhoods, parks, and other areas within San Francisco where City-owned street trees are located.
- **For asset/building data collection:** Islais Creek & Lefty O'Doul bridges, roadway structures such as retaining walls or stairs or bridges, rooftops of City properties where solar panels or other equipment such as HVAC are located, or exterior walls of buildings, including schools, Police and Fire stations, public libraries, and other City owned buildings, infrastructure, and facilities.
- **For Public Works project education/marketing/promotions:** various locations involving Public Works right-of-way or facility construction or repairs.
- **For surveying/mapping activity:** survey site locations along streetscapes, landscape areas, steep hillsides and cliffs, at bridges and fixed structures such as piers, etc.
- **During disaster/emergency response operations:** Disaster areas, emergency evacuation routes, and other areas within San Francisco requiring Public Works safety response operations.

Technology Details

- The following is a product description of Unmanned aerial vehicles ("UAV" or "Drone" technology).
- Phantom 4 RTK is an aerial survey drone that combines centimeter-level navigation and positioning with a high-performance imaging system for use during surveying, mapping or inspection operations.
- Intel Falcon 8+ is designed to provide consistent, stable flights with weak GPS signals, high winds as well as resistance to magnetic field.
- Falcone 8+ drone can provide detailed data for orthography and 3D reconstruction, with millimeter accuracy for ground sample distance. Unique, patented "V-shaped design enables a greater than 180-degree view from top to bottom. Falcon 8+ system can be configured as a closed system with isolated, on-board data storage that does not transmit data over the public internet.
- The Leica Aibot AX20 is built on a DJI UAV platform which can accommodate various sensor payloads for surveying, mapping and construction aerial data capture solutions.
- DJI Mavic 2 Enterprise Dual is an aerial survey drone that combines navigation and positioning with a high-performance imaging system for use during surveying, mapping or inspection operations.

IMPACT ASSESSMENT

The impact assessment addresses the conditions for surveillance technology approval, as outlined by the Standards of Approval in San Francisco Administrative Code, Section 19B:

- A. The benefits of the surveillance technology outweigh the costs.
- B. The Department's Policy safeguards civil liberties and civil rights.
- C. The uses and deployments of the surveillance technology are not based upon discriminatory or viewpoint-based factors and do not have a disparate impact on any community or Protected Class.

The Department's use of the surveillance technology is intended to support and benefit the residents of San Francisco while minimizing and mitigating all costs and potential civil rights and liberties impacts of residents.

A. Benefits

The Department’s use of Drones has the following benefits for the residents of the City and County of San Francisco:

- Education Drone imagery to promote Public Works projects and demonstrate use of tax dollars on projects.
- Community Development
- Health
- Environment Drone imagery to collect data on street-trees for maintenance and safety reasons.
- Criminal Justice
- Jobs
- Housing

- Other Public Safety: to inspect tree canopies for damaged limbs (fall risks), to provide support when determining safety routes during emergencies, to collect data and information during emergencies (particularly in the event of loss of cellular communications) and during post-disaster cleanup operations.

B. Civil Rights Impacts and Safeguards

The Department has considered the potential impacts and has identified the technical, administrative, and physical protections as mitigating measures:

Public Works strives to mitigate all potential civil rights impacts through responsible technology and associated data use policies and procedures and intends to use drones and their associated data exclusively for authorized uses cases. All other uses, including surveillance of San Francisco residents or groups, are expressly prohibited. Public Works drone operators/pilots will be prohibited from intentionally capturing data that can be used to identify individuals. Auto license plate information shall also not be deliberately captured.

To mitigate the risk of potential embarrassment, emotional distress, self-censorship or diminished civic engagement by SF residents whose personal information may be unintentionally captured, Public Works requires the “scrubbing” or otherwise obscuring/blurring (through use of image editing software) of all collected data to remove facial images or other personally identifiable information unintentionally captured by aerial drones.

All collected data, irrespective of the location of data capture or the identifying characteristics of captured persons, is subject to the same scrubbing processes and procedures. The image software scrubbing process obscures and blurs all data using either built-in AI recognition settings or through manual efforts by software operator. To protect drone data from potential breach, misuse or abuse that may result in civil rights impacts, data is maintained on secure, department-owned servers.

Only persons authorized to utilize the raw data may access the information and are required to maintain records of access using a drone data access log. Only data that has been edited to remove PII will be shared and stored on servers, and sharing will only occur with partner CCSF agencies for whom Public Works has been contracted to provide inspection, maintenance, repair, or construction services.

To further protect data and any personal resident information captured by a drone, all raw data will be permanently erased after it has been processed and edited to blur or obscure human features and license plate information. To mitigate any potential impacts to residents' physical safety or economic loss through property damage, all SFPW drone operators must have valid UAV pilot certifications.

C. Fiscal Analysis of Costs and Benefits

The Department’s use of Unmanned aerial vehicles (“UAV” or “Drone” technology) yields the following business and operations benefits:

| Benefit | Description | Quantity/Units |
|---|--|----------------|
| <input checked="" type="checkbox"/> Financial savings | Drones can be far more time efficient and cost effective when conducting asset inspections, by mitigating the need for traffic control, expensive scaffolding/swing stage or other equipment, and can provide more detailed photographs/videos of the assets or areas in need of maintenance or repairs than can be done manually, minimizing labor costs. | |
| <input checked="" type="checkbox"/> Time savings | Deploying a drone can provide time savings over setting up and employing equipment such as scaffolds/swing stages/scissor-lift vehicles, etc. | |
| <input checked="" type="checkbox"/> Staff safety | Drones can be deployed to dangerous locations instead of personnel, such as rooftops, at the sides of building/bridges, along cliff areas or areas prone to erosion. | |
| <input checked="" type="checkbox"/> Improved data quality | Some locations which are difficult to access by personnel may be more easily photographed using drone technology, thereby achieving better data. | |
| <input type="checkbox"/> Other | | |

The total fiscal cost, including initial purchase, personnel and other ongoing costs is

| | |
|----------------------|---|
| FTE (new & existing) | Estimate 4 existing employees: Mapping staff: 10 hrs/wk; Structural Section staff: 2 hrs/wk; Yard staff: 3 hrs/wk; Architectural staff: 4 hrs/wk |
| Classification | Surveyors (5310-14); Engineers (5201-18); Stationary Engineers (7333-35); BUF Inspectors (3435); Architectural Administrator (5120); Architects (5260-74) |

| | <i>Annual Cost</i> | <i>Years</i> | <i>One-Time Cost</i> |
|---|--------------------|--------------|----------------------|
| Total Salary & Fringe | \$148,800 | 1 | \$148,800 |
| Software | \$15,000 | 1 | \$15,000 |
| Hardware/Equipment | \$35,000 | 1 | \$35,000 |
| Professional Services | \$30,000 | 1 | \$30,000 |
| Training | \$5,000 | 1 | \$5,000 |
| Other | \$0 | 0 | \$0 |
| Total Cost | \$233,800 | | |
| 2.1 Please disclose any current or potential sources of funding (e.g. potential sources = prospective grant recipients, etc.). ^{SIR, ASR} | | | |
| <p>Personnel: Staff time devoted to use of drone for Inter-departmental work such as inspecting another agency’s building can be charged to that agency as a line item cost. Time used to inspect Public Works assets will be charged as any other labor costs associated with project or inspection work.</p> <p>Equipment: Funding to pay for cost of equipment purchase/lease and license for software to remove PII has been requested as part of the FY21 budget initiative process.</p> | | | |

COMPARISON TO OTHER JURISDICTIONS

Unmanned aerial vehicles (“UAV” or “Drone” technology) are currently utilized by other governmental entities for similar purposes.

APPENDIX A: Surveillance Impact Report Requirements

The following section shows all Surveillance Impact Report requirements in order as defined by the San Francisco Administrative Code, Section 19B.

1. Information describing the Surveillance Technology and how it works, including product descriptions from manufacturers.

Use of drone technology to intentionally capture images of a personal nature will always be prohibited.

Phantom 4 RTK is an aerial survey drone that combines centimeter-level navigation and positioning with a high-performance imaging system for use during surveying, mapping or inspection operations.

Intel Falcon 8+ is designed to provide consistent, stable flights with weak GPS signals, high winds as well as resistance to magnetic field. Falcon 8+ drone can provide detailed data for orthography and 3D reconstruction, with millimeter accuracy for ground sample distance. Unique, patented "V-shaped design enables a greater than 180-degree view from top to bottom. Falcon 8+ system can be configured as a closed system with isolated, on-board data storage that does not transmit data over the public internet.

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DJI Mavic 2 Enterprise Dual is an aerial survey drone that combines navigation and positioning with a high-performance imaging system for use during surveying, mapping or inspection operations.

2. Information on the proposed purpose(s) for the Surveillance Technology.

Drone technology will support our mission through the following:

1. In times of disaster preparedness or post-disaster mitigation, drones will provide critical emergency response functions such as logistical support for emergency routing, life safety, and cleanup efforts, not only assisting in protecting physical assets and public spaces but human life as well;
2. Drones will support the maintenance efforts of City-owned street trees pursuant to our mission of greening and improving City public spaces;
3. Drones will support the objective of maintaining city owned properties and landscapes by safely providing detailed photographic data and documentation to assist in the planning of corrective or new construction work by roofers, architects, engineers, electricians, PMs, CMs and other personnel.

3. If applicable, the general location(s) it may be deployed and crime statistics for any location(s).

For city trees data collection: Neighborhoods, parks, and other areas within San Francisco where City-owned street trees are located.

For asset/building data collection: Islais Creek & Lefty O’Doul bridges, roadway structures such as retaining walls or stairs or bridges, rooftops of City properties where solar panels or other equipment such as HVAC are located, or exterior walls of buildings, including schools, Police and Fire stations, public libraries, and other City owned buildings, infrastructure, and facilities.

For Public Works project education/marketing/promotions: various locations involving Public Works right-of-way or facility construction or repairs

For surveying/mapping activity: survey site locations along streetscapes, landscape areas, steep hillsides and cliffs, at bridges and fixed structures such as piers, etc.

During disaster/emergency response operations: Disaster areas, emergency evacuation routes, and other areas within San Francisco requiring Public Works safety response operations.

4. An assessment identifying any potential impact on civil liberties and civil rights and discussing any plans to safeguard the rights of the public.

Public Works strives to mitigate all potential civil rights impacts through responsible technology and associated data use policies and procedures and intends to use drones and their associated data exclusively for authorized uses cases. All other uses, including surveillance of San Francisco residents or groups, are expressly prohibited.

Public Works drone operators/pilots will be prohibited from intentionally capturing data that can be used to identify individuals. Auto license plate information shall also not be deliberately captured. To mitigate the risk of potential embarrassment, emotional distress, self-censorship or diminished civic engagement by SF residents whose personal information may be unintentionally captured, Public Works requires the “scrubbing” or otherwise obscuring/blurring (through use of image editing software) of all collected data to remove facial images or other personally identifiable information unintentionally captured by aerial drones. All collected data, irrespective of the location of data capture or the identifying characteristics of captured persons, is subject to the same scrubbing processes and procedures. The image software scrubbing process obscures and blurs all data using either built-in AI recognition settings or through manual efforts by software operator.

To protect drone data from potential breach, misuse or abuse that may result in civil rights impacts, data is maintained on secure, department-owned servers. Only persons authorized to utilize the raw data may access the information and are required to maintain records of access using a drone data access log. Only data that has been edited to remove PII will be shared and stored on servers, and sharing will only occur with partner CCSF agencies for whom Public Works has been contracted to provide inspection, maintenance, repair, or construction services. To further protect data and any personal resident information captured by a drone, all raw data will be permanently erased after it has been processed and edited to blur or obscure human features and license plate information.

To mitigate any potential impacts to residents' physical safety or economic loss through property damage, all SFPW drone operators must have valid UAV pilot certifications.

5. The fiscal costs for the Surveillance Technology, including initial purchase, personnel and other ongoing costs, and any current or potential sources of funding.

| | |
|--------------------------------|---|
| Number of FTE (new & existing) | Estimate 4 existing employees: Mapping staff: 10 hrs/wk; Structural Section staff: 2 hrs/wk; Yard staff: 3 hrs/wk; Architectural staff: 4 hrs/wk |
| Classification | Surveyors (5310-14); Engineers (5201-18); Stationary Engineers (7333-35); BUF Inspectors (3435); Architectural Administrator (5120); Architects (5260-74) |
| Total Salary & Fringe | \$148,800 |
| Software | \$15,000 |
| Hardware/Equipment | \$35,000 |
| Professional Services | \$30,000 |
| Training | \$5,000 |
| Other | \$0 |
| Total Cost [Auto-calculate] | \$233,800 |

Personnel: Staff time devoted to use of drone for Inter-departmental work such as inspecting another agency's building can be charged to that agency as a line item cost. Time used to inspect Public Works assets will be charged as any other labor costs associated with project or inspection work.

Equipment: Funding to pay for cost of equipment purchase/lease and license for software to remove PII has been requested as part of the FY21 budget initiative process.

6. Whether use or maintenance of the technology will require data gathered by the technology to be handled or stored by a third-party vendor on an ongoing basis.

Handled by third-party vendor, ongoing: true

Vendor name:

Special data handling required: false

7. A summary of the experience, if any, other governmental entities have had with the proposed technology, including information about its effectiveness and any known adverse information about the technology such as anticipated costs, failures, or civil rights and civil liberties abuses.

APPENDIX A: DPW Drone Checklist (Snapshot)

Drone Checklist for Drone Flight PMs, pilots, and data editors.

| Item Number | Activity Category | Sub Category | Who | What | How | Where | When |
|-------------|-------------------|-------------------|---|--|---|--|--|
| 1 | Pre-flight | Policy Review | <ul style="list-style-type: none"> Drone Pilot (Public Works staff and/or 3rd party contractor) Project Manager | Review of Public Works Drone Policy <i>note: as of 2.27.20 "Public Works Drone Policy" is CCSF Employee Drone Policy; will be replaced by Public Works Surveillance Technology Policy upon COIT review and approval</i> | <ul style="list-style-type: none"> Distribute electronic or paper copy of Policy to all parties for review. | Policy Statement for Drone Pilots and PMs (PW and Contractors) | <ul style="list-style-type: none"> Public Works staff: prior to flight Contractor: at contract execution AND prior to flight |
| 2 | Pre-flight | COIT notification | <ul style="list-style-type: none"> Drone Flight Project Manager ("PM") | Submission of Flight Summary Form | <ul style="list-style-type: none"> Complete and submit "Flight Summary Form" at Drone Usage Reporting sharepoint site. | CCSF Drone Usage Reporting site | 24 hours in advance of flight |

| | | | | | | | |
|---|------------|---------------------|--|---------------------------|---|-------------------------------|-------------------------------|
| 3 | Pre-flight | Public notification | <ul style="list-style-type: none"> • PM/Rachel Gordon | Posting of Public Notices | <ul style="list-style-type: none"> • Complete "Public Notice template" form • Submit completed notice to Rachel Gordon for posting at location. | Public Notice | 24 hours in advance of flight |
|---|------------|---------------------|--|---------------------------|---|-------------------------------|-------------------------------|